This Specification
consists of 05 pages

PIPING SPECIFICATION

FOR

STAINLESS STEEL PIPE

110GK-GM13, REV.2
NCK2

Prepared by the

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COMPONENT TEST FACILITY (E-1)

2	09/25/96	Reprinted in its entirety per FCR E1-055 (PP-125).	Michael Yantzer		N/A	N/A	
1	03/15/91	Revised per CR CTF-2051.	LDQ	BJH	N/A	LDQ	GAP
0	*08/21/90*	*Issued for Procurement.*	*MW*	*LJW*	*TAM*	*LW*	*GAP*
Rev. No.	Date	Description	Orig. By	Check By	Supv.	P.E.	Clt.
					Approvals		

PIPING SPECIFICATION
NCK2
Stainless Steel Pipe

SERVICE	DESIGN PRESSURE TEMPERATURE
LO,LN,GN,LH,GO	350 PSIG Max. -423 deg F to +100 deg F

ITEM	DESCRIPTION	SPECIFICATION
TUBING		
1/4", 1/2", 3/4" and 1"	Corrosion-resistant Stainless Steel (Note 1)	MIL-T-8808A(ASG) Preferred or MIL-T-8504A or MIL-T-8506A (Note 1)
PIPE		
1"	Sch. 10S, Electric fusion welded, Corrosion-resistant Stainless Steel, plain ends (Note 3)	ASTM A312 TP304L
1 1/2" thru 8"	Sch. 10S, Electric fusion welded, Corrosion-resistant Stainless Steel, beveled ends	ASTM A312 TP304L
10" thru 16"	Sch. 40S, Electric fusion welded, Corrosion-resistant Stainless Steel, beveled ends	ASTM A312 TP304L
FITTINGS		
1/4" thru 1"	Forged stainless steel, 37o flare.	
1 1/2" thru 8"	Sch. 10S, Wrought, Corrosion-resistant Stainless Steel, buttweld ends	ASTM A403 WP304L ANSI B16.9, B16.28
10" thru 16"	Sch. 40S, Wrought Corrosion-resistant Stainless Steel, buttweld ends	ASTM A403 WP304L ANSI B16.9, B16.28
WELDOLETS		
1 1/2" thru 8"	Weldolets, Sch. 10S, forged, Corrosion-resistant Stainless Steel, buttweld ends	ASTM A182 Gr.F304L ANSI B16.9
10" thru 16"	Weldolets, Sch. 40S, forged, Corrosion-resistant Stainless Steel, buttweld ends	ASTM A182 Gr.F304L ANSI B16.9

ITEM	DESCRIPTION	SPECIFICATION
TEES		
1 1/2" thru 16"	Tee, Wrought, Corrosion-resistant Stainless Steel, Buttweld ends, match pipe schedule	ASTM A182 Gr. F304L ANSI B16.9
FLANGES		
1 1/2" thru 16"	300 # ANSI, Forged Corrosion-resistant, Stainless Steel, buttweld ends, 125 to 250 AARH or RMS face finish, bore for pipe schedule, with concentric 90 degree "V" groove rings in flange face.	ASTM A182 Gr.304L ANSI B16.5
GASKETS (See Note 2)		
All Sizes	304L/316 L Flexitallic Style CG, Class 300, spiral wound with stainless steel and pure virgin TFE filler 0.175" thick with 0.125 thick stainless steel inner and outer gauge ring. (Gasket compresses to 1/8" thickness.)	ASME/ANSI B16.21
BOLTING		
All Sizes	Studs, full thread, Corrosion-resistant type 304 Stainless Steel	ASTM A320 Gr.B8 Cl.2 (Strain Hardened)
	Nuts, hex heavy, Corrosion-resistant type 304 Stainless Steel	ASTM A194 Gr.8
VALVES	See Valve Summary and Data Sheets.	

WELDING — Unless otherwise specified, welding shall be performed in accordance with Chapter V of ASME/ANSI B31.3. No backup rings or consumable inserts will be allowed.

HANGERS — See contract drawings.

INSPECTION — 100 percent visual inspection all joints. 100 percent radiographic weld inspection per ANSI B31.3 on 10 percent of the welds.

TESTING
HYDROSTATIC — Prior to testing, disconnect all equipment from the piping. The hydrostatic test pressure of 525 psig shall be held for period required for inspection of all joints with no loss in gage pressure or 10 minutes whichever is greater. Each piping segment shall be individually hydrostatically tested in the fabricator's shop. Repair all leaks at atmospheric pressure. Retest.

CLEANING — Unless otherwise specified, all piping shall be cleaned in accordance with requirements of NASA/SSC Standard 79-001 to the level indicated on the P&IDs.

TESTING-OPERATIONAL
AND
TEST REPORTS — Upon the completion of hydrostatic testing and cleaning, install a new gasket; reconnect all equipment, etc., to the piping system. Energize the entire system with dry nitrogen gas with a 5% helium gas tracer and a minimum dew point of -40F, to design pressure and "Leak-Tek" test all final connections. Repair all leaks and retest as required. If repairs require welding, then hydrotesting, cleaning, and retesting will be required. All tests shall be witnessed by an authorized representative of the Construction Manager. The Contractor shall furnish a certificate of inspection and testing signed by his representative and those witnessing the test.

CERTIFICATION — Chemical analysis and tensile test as required by ANSI B31.3 for ASTM A182 GR.304L material.

100 percent radiography of all castings used for 12" and 16" pipe segments is required.

Note 1: The use of threaded connections and fittings shall be limited to instrumentation pressure, flow, temperature, purge connections, and safety valve connections. Female straight threads tubing connections at valve and instrumentation shall conform to MS 33649. Stainless Steel tubing systems shall be in conformance to Pipe Class M2 NASA/SSC Standard 47-220 except that minimum wall thicknesses will be as called out below:

Tubing Size	Minimum Wall Thickness
1/4"	.035"
1/2"	.035"
3/4"	.035"
1"	.035"

Note 2: The TFE used in gaskets shall be batch/lot traceable from the TFE manufacturer in accordance with NASA/SSC Drawing 54000-GM30. This applies to piping in LOX and GOX service ONLY.

Note 3: 1" nominal pipe size is shown for reference only. 1" nominal pipe is to be used as the inner line of the 1" nominal vacuum jacketed pipe specified in Piping Specification ACK3. ALL non-vacuum jacketed 1" line are to fabricated from the specified tubing specification.

Note 4: All threaded connections shall have 16 RMS finish for sealing surfaces.